Bulletin 38

BEDROCK GEOLOGY OF MOUNT DESERT ISLAND

A Visitor's Guide to the Geology of Acadia National Park

by

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68°27'30" 25' 20' 15' 10' 44°27'30"

25' 20' 15' 44°12'30"

EXPLANATION

INTRUSIVE ROCKS

DEVONIAN

Granite - Miscellaneous small granite bodies. All contain biotite mica. Subscripts do not indicate relative ages.

- Dg1 (Baker Island): Pink, medium-grained granite with a faint northeasterly "grain" due to parallelism of biotite grains.
- Dg2 (Seawall to Bass Harbor): Pink, fine-grained granite with a distinctive sugary texture. Contains abundant veins of coarser quartz and feldspar.
- Dg3 (Pretty Marsh Harbor): Pink, medium-grained granite occurring as dikes in the gabbro-diorite.
- Dg4 (Northeast Brook): Pink, medium-grained granite with scattered larger crystals of light lavender alkali feldspar.

Dsg **Granite of Somesville** - Pink and gray, medium-grained biotite granite containing pink or cream-colored alkali feldspar and light gray plagioclase.

- Dsg1 Fine-grained variety of the Somesville granite.

Dcg **Granite of Cadillac Mountain** - Pink to greenish-gray, coarse-grained granite. The individual grains of translucent, gray, glassy-looking quartz and pink or gray feldspar are easily seen; the black minerals are hornblende and occasionally biotite.

- Dcg1 Recrystallized zones within the Cadillac Mountain granite.

Dshg **Granite of Southwest Harbor** - Light gray, fine-grained granite, commonly with a tan or pinkish hue. Contains both biotite mica and hornblende.

Dgd **Gabbro-diorite** - Gabbro dark gray, coarse-grained rock consisting of black pyroxene and/or hornblende, and gray plagioclase feldspar. Diorite: lighter gray color due to the greater abundance of light gray plagioclase feldspar.

Diabase dikes on Cadillac Mountain: dark gray, fine-grained rock.

SHATTER ZONE

DEVONIAN

Dsz **Shatter zone** - Zone of intensely shattered country rock surrounding the Cadillac Mountain granite. Near the granite contact it consists of angular blocks of dark country rock embedded in light gray "granite."

STRATIFIED ROCKS

SILLURO-DEVONIAN

Cranberry Island Series

- SDcif Felsites and flows: Blue-gray to light brown felsites and gray to brown dacite flows.
- SDcit Tuffs: Gray crystal and lithic tuffs. Many of the beds appear water-laid, but ash falls and flows are present.
- SDcis Interbedded volcanic rocks and contact metamorphosed siltstones and slates, including hornfels and gray, lavender, or cream-colored spotted slates.

SDbh **Bar Harbor Formation** - Siltstones and sandstones displaying regular beds a few inches thick. The beds weather to a tan, gray, or lavender color but are typically dark on a freshly broken surface.

----------UNCONFORMITY----------

CAMBRO-ORDOVICIAN

€Oe **Ellsworth Schist** - A dark green or gray schist, often with a distinctive streaked appearance caused by thin, lighter colored layers of quartz and feldspar. The dark layers consist mostly of the mineral chlorite.

SYMBOLS

- Geologic contact between adjacent map units.
- Fault
- 73 Orientation of bedding in volcanic and sedimentary rocks (inclined and vertical)
- 55 Orientation of compositional layering in gabbro-diorite (inclined and vertical)
- 16 Orientation of metamorphic foliation (parallel alignment of platy minerals (inclined and vertical)
- 25 Orientation of inclusions in the Cadillac Mountain granite (inclined, vertical, and horizontal)

SITES OF GEOLOGIC INTEREST

(1) Location of site

1. **Gabbro and diorite.** Park on the shoulder of the road overlooking the beach at Hulls Cove. The 15-foot cliff along the center of the beach is composed of well-jointed, dark gray gabbro (nearest the water) grading to lighter gray diorite towards the road. At least three sets of joints are visible: a vertical set running into the cliff; a set dipping 45° towards the water; and a third set dipping approximately 80° inland. The thread-like white lines on the surface of the rock are quartz veins occupying old joints. The several rusty-colored zones are due to the weathering of iron sulfide minerals that were deposited along joints. This exposure has several excellent examples of "boxwork veining."

2. **Bar Harbor Formation.** From the pier in Bar Harbor, walk southeasterly along the shore path overlooking the beach. The rocks along the water below the motor inn and restaurant are Bar Harbor Formation. Notice the bedding in the rocks and how it tilts toward the ocean. Approximately 200 yards south there is a good example of a sea stack, formed by wave erosion. *See Figure 4.*

3. **Shatter zone surrounding the Cadillac Mountain granite.** From the parking lot at Sand Beach walk to the eastern end of the beach. The large angular inclusions in the cliffs at this end of the beach are country rock (gabbro/diorite and metasediments) engulfed in the shatter zone. *See Figures 7 and 8.*

4. **Diabase dike.** Park in the turnout approximately 1.7 miles from the entrance to the summit road (immediately past the hairpin turn). About 60 yards downhill from the turnout there are excellent examples of near vertical diabase dikes cutting the Cadillac Mountain granite. The dikes are bluish-gray in color, and can be seen on both sides of the roadcut. Compare the dikes on the north side of the roadcut with their extensions on the south side and note how the dikes vary considerably in thickness over this short distance. Look closely at the edges of the dikes on the north side of the road and observe the chilled margin, about 2 inches wide, where the mineral crystals are much finer-grained. *See Figure 10.*

5. **Cadillac Mountain granite.** Park at the top of Cadillac Mountain and walk on the paths that lead toward the summit. Several sets of joints are well displayed in the granite, and the rock has weathered preferentially along the joints emphasizing the fractures. *See Figure 11.*

6. **Quarries in the Somesville granite.** Several abandoned quarries are visible in and around the village of Hall Quarry. *See Figure 9.*

7. **Volcanic tuff of the Cranberry Island Series.** Next to the parking area west of the Seawall picnic area there are a number of good exposures of light gray volcanic tuff. Notice the fragments of volcanic ejecta included in the rock. This texture is very typical of "air fall" tuffs. *See Figure 6.*

8. **Ellsworth Schist.** From route 102 just north of Seal Cove take the road 0.5 miles west to the public boat access. Approximately 100 yards beyond the boat launch area the ledges contain excellent examples of complexly folded gray and white banded Ellsworth Schist jutting into the water. *See Figure 3.*

N

1 0 1 Mile
5,000 0 5,000 Feet
1 0 1 Kilometer